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File: JPAB Jan 26, 1980

L1: Entry 4 of 14

PUB-NO: JP355011329A
DOCUMENT-IDENTIFIER: JP 55011329 A
TITLE: SEMICONDUCTOR DEVICE

PUBN-DATE: January 26, 1980

INVENTOR-INFORMATION:

NAME	COUNTRY
YAMAZAKI, SHUNPEI	

US-CL-CURRENT: 257/56; 257/62, 257/63, 257/65, 257/74, 257/75, 257/77, 257/616
INT-CL (IPC): H01L 31/10; H01L 29/00

ABSTRACT:

PURPOSE: To make it possible to vary energy band continuously, by providing a non-single crystal semiconductor containing an additive capable of varying energy band, on a non-single crystal semiconductor having one conducting type.

CONSTITUTION: Amorphous or polycrystalline non-single crystal film is formed on a semiconductor or insulator by using a material which becomes a semiconductor, such as silicon, silane, dichlorosilane, and other silified gas. Next, on top of this is formed a non-sigle crystal film consisting of silicon to which hydrogen, heavy hydrogen, or a hologen compound such as of chlorine. These substances bond with the unpaired bonding hands of silicon and suppress the occurrence of re-bonding center and perform neutralization electrically. Further, carbon, nitrogen and oxygen are equally dispersed and added to the semiconductor. As a result, there is no specific boundary level, and the energy band assumes continuity or smooth discontinuity. For semiconductor material, germanium, silicon carbide, or compound semiconductor, besides silicon, may be used.

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L14: Entry 2 of 10 File: JPAB Mar 10, 1998

PUB-NO: JP410070091A
DOCUMENT-IDENTIFIER: JP 10070091 A
TITLE: MANUFACTURE OF SEMICONDUCTOR DEVICE

PUBN-DATE: March 10, 1998

INVENTOR-INFORMATION:
NAME COUNTRY
DOI, TSUKASA

ASSIGNEE-INFORMATION:
NAME COUNTRY
SHARP CORP

APPL-NO: JP08226381
APPL-DATE: August 28, 1996

INT-CL (IPC): H01L 21/285; H01L 21/768

ABSTRACT:

PROBLEM TO BE SOLVED: To solve the problem that sheet resistance just after film formation changes with time and is not stabilized in a titanium nitride film formed by using TDMAT(tetrakisdimethylamino titanium) as material.

SOLUTION: A part of a silicon oxide film 2 formed on the surface of a silicon substrate 1 is opened, and a contact hole is formed. After a titanium film 3 is formed by a sputtering method or a CVD method, a titanium nitride film 4 is formed. Without exposure to the atmosphere, i.e., the silicon substrate is not exposed to atmospheric air. At 420°C, monosilane (SiH4) only, i.e., 100% of SiH4 is treated for reaction for 30-90 seconds, at a flow rate of 50sccm and a pressure of 10Torr. A tungsten plug is formed after tungsten 5 is formed. A titanium film is formed after the contact hole is formed. The titanium nitride film which is formed by using organic titanium compound excellent in step coverage to a fine contact hole is heat-treated in a silane atmosphere. Thereby a titanium nitride film whose sheet resistance is stable and low can be formed in the contact hole.

File: TDBD Apr 1, 1991

L2: Entry 2 of 6

TDB-ACC-NO: NN9104352

DISCLOSURE TITLE: Oxide-Free Dielectric/GaAs Interface With No Excess As.

PUBLICATION-DATA:
IBM Technical Disclosure Bulletin, April 1991, US

VOLUME NUMBER: 33
ISSUE NUMBER: 11
PAGE NUMBER: 352

PUBLICATION-DATE: April 1, 1991 (19910401)

CROSS REFERENCE: 0018-8689-33-11-352

DISCLOSURE TEXT:

- Disclosed are processes which prevent Au movement between Au-based ohmic contacts and a Schottky gate. This phenomena, due to surface instabilities between ohmic contact and gate, is attributed to GaAs native oxides and excess As formed at dielectric/GaAs interface. The processes disclosed here produce an oxide-free interface with no excess As. - One process uses a H2 and N2 plasma treatment before dielectric deposition (1). The plasma treatment which removes any residual oxide and excess As is performed after the GaAs native oxides are removed by wet etch. In a second process, the native oxides are removed by wet etch and H2 plasma; then a thin Si layer to prevent surface oxidation is deposited by PECVD of SiH4 before dielectric deposition (2). - References (1) A. Callegari, D. Lacey, D. A. Buchanan, E. Latta, M. Gasser, and A. Paccagnella "Surface studies of GaAs treated by hydrogen and nitrogen rf plasma," Int. Symp. GaAs and R elated Compounds, Karuizawa, Japan (1989). (2) A. Paccagnella, A. Callegari, J. Batey, and D. Lacey, "Properties and thermal stability of the SiO2/GaAs interface with different surface treatments," Applied Phys . Lett . 57, 258 (1990).

L5 ANSWER 4 OF 5 INSPEC COPYRIGHT 2001 IEE
AN 1994:4822697 INSPEC DN A9424-8115H-060; B9412-0520F-082
TI Influence of wafer preclean before selective tungsten CVD on surface properties of interconnect and intermetal dielectric materials.
AU Schulz, S.E.; Hintze, B.; Grunewald, W. (Fakultet fur Elektronik und Informationstechnik, Tech. Univ. Chemnitz, Germany); Hofmann, A.
SO Physica Status Solidi A (16 Oct. 1994) vol.145, no.2, p.311-18. 5 refs.
CODEN: PSSABA ISSN: 0031-8965
Conference: 4th International Symposium on Trends and New Applications in Thin Films - TATF '94 and the 11th Conference on High Vacuum, Interfaces, and Thin Films - HVITF '94. Dresden, Germany, 7-11 March 1994
Sponsor(s): Deutsche Forschungsgemeinschaft; Comm. Eur. Union
DT Conference Article; Journal
TC Experimental
CY Germany, Federal Republic of
LA English
AB Results of selective tungsten CVD on **titanium nitride** (**TiN**) are summarized. The investigations are focused on the influence of precleaning and tungsten nucleation on the **TiN** and SiO2 surface, the CVD-W/**TiN** interface and the electrical properties of the contacts (via resistance). After a combination of HF dip and NF3 plasma a remarkable amount of fluorine was detected at the **TiN** surface which was not bound to Ti. This process showed the best effect on the reproducible nucleation of tungsten. No interfacial layer could be found by cross section TEM after the tungsten nucleation. But in the case of nucleations starting with **SiH4** gas inlet tungsten growth begins with the formation of a mixture of alpha - and beta -phase tungsten. More far away from the interface region only alpha -W was detected. The lowest via resistances in filled vias were measured for nucleations starting with WF6 gas inlet. For introducing **SiH4** first the via resistance could be decreased using a **H2** plasma conditioning of the wafer in the deposition chamber after dry pretreatments. For this case no remarkable change of the deposition surface was found by XPS. At wafers pretreated with BCl3/**N2** plasmas on both surfaces (**TiN** and SiO2) boron nitride was found.
CC A8115H Chemical vapour deposition; A6855 Thin film growth, structure, and epitaxy; A7340C Contact resistance, contact potential, and work functions; B0520F Vapour deposition; B2550F Metallisation; B2550E Surface treatment
CT CHEMICAL VAPOUR DEPOSITION; CONTACT RESISTANCE; METALLISATION; NUCLEATION; SURFACE TREATMENT; TRANSMISSION ELECTRON MICROSCOPE EXAMINATION OF MATERIALS; TUNGSTEN; X-RAY PHOTOELECTRON SPECTRA
ST wafer preclean; selective W CVD; surface properties; intermetal dielectric materials; interconnects; **TiN**; nucleation; SiO2 surface; **CVD-W/TiN interface**; electrical properties; via resi